

Remarks

Claims 1-10 are currently pending in the patent application, with claims 21-28 added by way of the present amendment. For the reasons and arguments set forth below, Applicant respectfully submits that the claimed invention is allowable over the cited references.

In the non-final Office Action dated March 20, 2008, the following rejections are presented: claims 1-10 stand rejected under U.S.C. § 112(2); claims 1-10 stand rejected under U.S.C. § 102(b) over the Haberman reference (U.S. Patent No. 6,417,075); claims 1-2 and 4-10 stand rejected under U.S.C. § 102(b) over the Schrantz reference (U.S. Patent No. 5,552,345); claims 1-2, 4-6 and 9-10 stand rejected under U.S.C. § 102(a) and 102(e) over the Chong reference (U.S. Patent No. 6,544,863); claim 9 stands rejected under U.S.C. § 103(a) over the Haberman reference; and claims 3 and 7-9 stand rejected under U.S.C. § 103(a) over the Chong reference. Applicant respectfully traverses each of these rejections.

Applicant submits that the § 112(2) rejection of claims 1-10 is improper, and that the claims have the requisite clarity because they are understandable by one of skill in the art in light of the specification. The Office Action asserts that the use of the term “substantially” is unclear in the recitation that the first material has a dilatation behavior that is substantially the same as that of the carrier material. Applicant disagrees. It is clear from the specification that the first material and the carrier material may have, but need not have, the same dilatation behavior. Moreover, it is clear from the specification that the stresses relieved by the structures of the intermediate layer are caused by the dilatation mismatch with the intermediate layer material, and not in any substantial way to a dilatation mismatch that may exist between the first material and the carrier material. In fact, Applicant discloses that reduced warping of the composite substrate is one result of the carrier material and first material being the same (*see, e.g.*, paragraph 0015), but that the exact dilatation behavior is also affected by properties such as crystallographic orientation (*see, e.g.*, paragraph 0030). Applicant therefore submits that it is well within the level of skill in the art to ascertain, in light of the specification, whether the dilatation behavior of the first material and carrier material are substantially the same. *See* M.P.E.P. § 2173.05(b) “Relative Terminology.” Thus, the use of the term “substantially” does not render the claims unclear.

The Office Action further asserts that the wording of claim 1 renders unclear which materials exhibit the recited dilatation mismatch. Applicant disagrees, and submits that it would be abundantly clear to one of skill in the art that the dilatation mismatch is between the first material and the second material (of which the intermediate layer is composed). However, without acquiescence and for the purposes of expediting prosecution, Applicant submits that the current amendment renders this ground for rejection moot.

The Office Action additionally asserts that Applicant's claims include insufficient detail regarding the structures of the intermediate layer. Applicant disagrees. Applicant does not merely recite a structure, but rather that the intermediate layer includes plural structures that are arranged to relieve stresses caused by the claimed dilatation mismatch. As such, the claim language provides clarity sufficient to allow one of skill in the art to understand the scope of the subject matter sought to be protected. It appears that the Office Action has confused breadth of claim scope with indefiniteness, which should not be equated. *See, e.g.*, M.P.E.P. § 2173.04. At the same time, it appears that the Office Action has taken an overly broad view of the claims by ignoring the recitation that the plural structures are arranged to relieve stress, and by positing that the claims could be read to cover every SOI wafer. In view of the above, such is clearly not the case.

The Office Action further asserts that there is insufficient antecedent basis for the reciting, "the dimensions of the structures in the plane of the intermediate layer." Applicant disagrees, and submits that strict antecedent basis is not required when reciting an inherent characteristic of an element. *See, e.g.*, M.P.E.P. § 2173.05(e), and *Bose Corp. v. JBL, Inc.*, 274 F.3d 1354, 1359 (Fed. Cir 2001) (holding that recitation of "an ellipse" provided antecedent basis for "an ellipse having a major diameter" because "[t]here can be no dispute that mathematically an inherent characteristic of an ellipse is a major diameter." In this case, Applicant merely recites that the dimension of the recited structures in a given plane are no bigger than a certain amount, meaning that the expanse of each structure within that plane can extend no more than a centimeter. Such a recitation is sufficiently clear.

The Office Action also asserts that claims 8 and 9 are contradictory because it is unclear how structures can lie in perpendicular and parallel planes. Applicant disagrees. The claimed structures, like any physical object, exist in three dimensions, and therefore will

have cross-sectional shapes defined by the intersection with various planes, even planes at right angles. Claim 8 recites that the structures are line symmetric in a cross-sectional cut that is perpendicular to the plane of the carrier, and claim 9 recites that the structures have certain shapes within a cross-sectional cut that is parallel to the plane of the carrier. Such recitations are understandable and clearly not contradictory.

For each of the reasons given above, Applicant submits that the various bases for the § 112(2) rejection of claims 1-10 are in error. Applicant therefore requests that the rejection be reconsidered and withdrawn.

With respect to remaining rejections (claims 1-10 rejected individually over the Habberger reference, the Schrantz reference, and the Chong reference), Applicant submits that the Office Action has failed to provide correspondence for each of the recited features. In particular, none of the cited references teach or suggest a composite substrate where the intermediate layer (made of second material exhibiting a dilatation mismatch with a first material) includes structures of the second material arranged to absorb stresses originating from the dilatation mismatch. Instead, the Office Action points to certain features in each reference, and concludes that such features must inherently perform the claimed stress relief function. The pertinent feature from each reference is discussed below.

The Habberger reference discloses slots in a sacrificial bonding layer that are provided for the supply and extraction of an etchant. Because the slots are part of a sacrificial layer, they are no longer present after processing, and therefore could not contribute to stress relief. Applicant finds nothing in Habberger related to the use of intermediate layer structures for the relief of stresses caused by dilatation mismatch with the material of the intermediate layer, as claimed.

The Schrantz reference discloses scribe lines for separating circuit dies after processing. Once the dies are separated, the scribe line structure no longer exists, and therefore could not contribute to stress relief. Applicant finds nothing in Schrantz related to the use of intermediate layer structures for the relief of stresses caused by dilatation mismatch with the material of the intermediate layer, as claimed.

The Chong reference discloses thin etch stop portions formed during a directional etching process of making multiple height subsurface layers. After processing, the etch stops no longer exist, and therefore could not contribute to stress relief. Applicant finds

nothing in Chong related to the use of intermediate layer structures for the relief of stresses caused by dilatation mismatch with the material of the intermediate layer, as claimed.

Moreover, Applicant submits that it is inappropriate to conclude that the claimed stress relief function would be inherent in the cited features of any of these references. For a property to be inherent, it must necessarily flow from a claimed structure. As discussed above, there is no basis for concluding that the claimed stress relief property would flow from any of the features in the cited references. Further, Applicant's specification discusses various aspects that may contribute to the stress relief function of the structures, including the dimensions of the structures (*see, e.g.*, paragraph 0015), the extension of the structures into the carrier (*see, e.g.*, paragraph 0029), the provision of rounded corners on the structures (*see, e.g.*, paragraph 0014), the particular structure geometry (*see, e.g.*, paragraphs 0019 and 0035), and so forth. As an example, such stress relief function is not inherent in such cited teachings where the dimensions and geometries of the structures do not allow stress-induced dislocations in a structure to migrate to a free surface of the structure for elimination. In the face of such a variety of factors, the claimed stress relief function cannot properly be considered an inherent property.

For at least these reasons, Applicant submits that each of the following rejections is improper: the § 102(b) rejection of claims 1-10 and the § 103(a) rejection of claim 9 over Habeger; the § 102(b) rejection of claims 1-2 and 4-10 over Schrantz; and the § 102(a)/(e) rejection of claims 1-2, 4-6 and 9-10 and the § 103(a) rejection of claims 3 and 7-9 over Chong. Reconsideration and withdrawal of each of these rejections is requested.

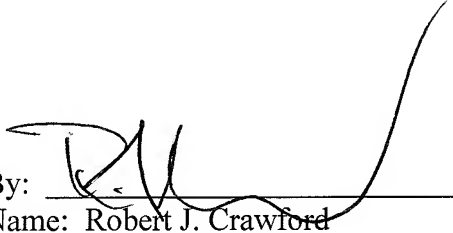
Moreover, Applicant submits that the subject matter additionally recited in the newly added claims 21-28 is allowable over the art of record. In particular, none of the applied references appears to teach stress relief structures formed integrally with a carrier layer, optionally with rounded corners, as recited in claims 23 and 24. As another example, none of the applied references appears to teach that stress relief structures have free surfaces arranged to allow dislocations to migrate and disappear as recited in claim 25. None of the applied references appears to teach stress relief structures that are included at selected locations of the intermediate layer, such as locations where stress originating from the dilatation mismatch is likely to occur, as recited in claims 26 and 27. Finally,

none of the applied references appears to teach stress relief structures provided as free standing pillars on the carrier layer as recited in claim 28.

In view of the remarks above, Applicant believes that each of the rejections/objections has been overcome and the application is in condition for allowance. Should there be any remaining issues that could be readily addressed over the telephone, the Examiner is asked to contact the agent overseeing the application file, Peter Zawilski, of NXP Corporation at (408) 474-9063.

Please direct all correspondence to:

Corporate Patent Counsel
NXP Intellectual Property & Standards
1109 McKay Drive; Mail Stop SJ41
San Jose, CA 95131
CUSTOMER NO. 65913

By: 
Name: Robert J. Crawford
Reg. No.: 32,122
(NXPS.513PA)